

YEAR 1901

Twelve storms were found to have occurred in 1901. Tracks for these storms are presented in Fig. 1.

Storm 1, 1901 (Jun. 11-15), T. S.

The following information was found in relation to this storm:

- 1) Data for 8 A.M. (E.S.T.) extracted from Historical Weather Maps: Jun. 10, Havana, E. f. 2, rain, 29.95; Camaguey, E. f. 4, 29.98; ship near 20 N., 82 W., E.N.E. f. 4, 29.91; Kingston, N. f. 1, 29.97; ship near 21 N., 86 W., S.E. f. 4, 29.88. Jun. 11, ship near Cape San Antonio, N.E. f. 4, 29.91; Havana, E. f. 5, 29.87; ship near 24 N., 83.5 W., N. f. 2, rain, 29.97. Jun. 12, ship near 23 N., 86 W., S. f. 5, (wind direction questionable or perhaps wrong location), showers, 30.00 (pressure too high); Key West, S.S.E. f. 3, 29.88; Havana, S.S.E. f. 4, 29.85; ship near 26 N., 86.8 W., N.E. f. 5, 29.91; ship near 27 N., 86 W., N.E. f. 5, 29.94; Tampa, E. f. 2 (pressure could not be read); Jupiter, S.E. f. 5, 29.93. Jun. 13, Charleston, E. f. 6, 30.01; Jacksonville, S. f. 3, 29.88; Tampa, S.S.E. f. 3, 29.86; Jupiter, S.S.E. f. 4, 29.93; Pensacola, N.N.E. f. 2, 29.90; ship near 28 N., 88 W., N.N.E. f. 2, 29.89; ship near 26 N., 87 W., E.N.E. f. 3. Jun. 14, a small low placed between Montgomery and Atlanta. Jun. 15, a small low over extreme western Kentucky. Jun. 16, low could not be identified any longer (Historical Weather Maps, Jun. 1901). Author's note: Wind forces (f) are on Beaufort scale, pressures are in inches. 2) Maximum velocities that could be associated with this weather system: Jupiter, E. 36 mph on Jun. 12; Savannah, E. 30 mph on Jun. 13; Charleston, S.E. 43 mph on Jun. 13 (Monthly Weather Review, Jun. 1901). 3) Storm of Jun. 13, 1901. Mobile. Minor (Dunn and Miller, 1960). 4) Map showing a track for this system as follows: near Havana in the morning of Jun. 12, near Tampa in the evening of Jun. 12, near Cape San Blas, Fl. in the morning of Jun. 13, near Mobile in the evening of Jun. 13 and near Montgomery in the evening of Jun. 14. Minimum pressure along the track: 29.84 inches (Monthly Weather Review, Jun. 1901). 5) A storm was first observed near 18 N., 83 W. on Jun. 10, 1901 and lasted 4 days; it was last observed at 31 N., 87 W. (Mitchell, 1924). Author's note: Tannehill (1938) showed a similar track but he extended it well into the continent. The tracks in Mitchell (1924) and Tannehill (1938) are quite similar to the one in Neumann et al. (1993).

The information contained in the above items suggested the introduction of some modifications along the track shown for this weather system in Neumann et al. (1993). Based in information for Jun. 11 in item 1), the author of this study decided to start his track for this weather system at 7 A.M. that day by tentatively locating a center of low pressure near 20.7 degrees N., 83.5 degrees W., which is about 75 miles to the S.S.E. of the corresponding position given in Neumann et al. (1993). The fact that the author started his track one day later than Neumann et al. (1993) reflects that he was unable to document any 7 A.M. Jun. 10 position for the center of this very weak system on the basis of information for that day in item 1). While crossing western Cuba on

Jun. 11, the system should have been very weak since M. Gutierrez-Lanza does not mention it in his catalog of Cuban cyclones (Sarasola, 1928) and Martinez-Fortun (1942) does not mention it either. Even on the morning of Jun. 12, the low pressure system seems to have been poorly organized over the southeastern Gulf of Mexico, with reported winds not exceeding force 5 on the Beaufort scale and only one ship report showing a questionable wind from the S. The author's estimated position for Jun. 12 was near 24.0 degrees N., 85.0 degrees W. on the basis of information for that day in item 1); such a position was found to be about 50 miles to the S.S.E. of the one in Neumann et al. (1993). Based on information in item 1), the author of this study estimated the following 7 A.M. positions for the period Jun. 13-15: Jun. 13, near 28.5 degrees N., 84.7 degrees W; Jun. 14, near 32.5 degrees N., 85.0 degrees W.; Jun. 15, near 37.0 degrees N., 88.0 degrees W. The author's 7 A.M. Jun. 13 position was about 120 miles to the E.N.E. of the corresponding one in Neumann et al. (1993) and the author's 7 A.M. Jun. 14 position was about 180 miles to the N.E. of the one shown in the above mentioned publication; no comparison is given for Jun. 15 because Neumann et al. (1993) terminated their track on Jun. 14. The author's track for Storm 1, 1901 is shown in Fig. 1.

In spite of that there were some indications that this weather system was very weak and winds of tropical storm intensity (43 mph) were reported only at Charleston (item 2) far away from the center, the author of this study decided to keep the tropical storm status that Neumann et al. (1993) gave to it. That status was indicated along the author's track until the system left north Florida on Jun. 13, and the status of a dissipating depression was denoted on Jun. 14-15.

Storm 2, 1901 (Jul. 1-10), T. S.

The following information was found about this storm: 1) The disturbance appeared in the vicinity of Barbados on Jul. 2, passed thence N. of W. over the Caribbean Sea to the Yucatan Channel by the night of Jul. 7 and reached the Texas coast on Jul. 10. This disturbance had the character of a large shallow depression rather than that of a well-defined hurricane. On Jul. 2, the lightship "Flummense" encountered a gale 60 miles N.N.W. of Barbados and severe rain and wind storms were reported along the southern coast of Haiti. Rough weather was also reported on the south coast of Cuba during Jul. 8 (it should probably read Jul. 7) Beginning on Jul. 9, Texas coast interests were fully informed by the Weather Bureau relative to the advance of the disturbance over the Gulf (Monthly Weather Review, Jul. 1901). Author's note: Similar information was found in Tannehill (1938). 2) On Sunday (Jul. 7) persons living in La Coloma (southern coast of Pinar del Rio province) were scared by weather conditions that reminded those of the 1882 cyclone. Since very early that day the sea rose and the majority of the houses were flooded. The tug steamer "Aguila" went ashore being pushed by the force of the wind and, in addition, some sloops came ashore. About 2 P.M. conditions calmed. The barometer started rising about 10 A.M. as fast as it has dropped and this indicated that the danger had passed (Diario de la Marina, Havana,

Jul. 10, 1901, evening edition, p.2, col.3). 3) Data for 8 A.M. (E.S.T.) extracted from Historical Weather Maps: Jul. 1, ship near 6.7 N., 54 W., S.W. f. 4, rain, 29.91. Jul. 2, Barbados, E.N.E., f. 2, 29.81; ship near 11.7 N., 59 W., N.E. f. 7,; center of a low placed 11.5 N., 58.5 W. Jul. 3, San Juan, E. f. 4, 29.89; St. Kitts, E. f. 4, 29.91; Dominica, W. f. 2, 29.87; ship near 12.7 N., 58.8 W., W.S.W. f. 2, 29.94; Barbados, S.E. f. 1, 29.90; center of a low placed 15.5 N., 65 W., no data in the vicinity. Jul. 4, Port-au-Prince, E. f. 9, 29.81 (not clearly read); Santo Domingo, N.E. f. 2, 29.89; Curacao, S.E. f. 4, 29.80; ship near 15.7 N., 75 W., N.E. f. 2, 29.86; ship near 14.8 N., 74 W., N.E. f. 2, rain, 29.86; ship near 16 N., 69 W., S.E. f. 4, 29.94. Jul. 5, Santiago de Cuba, E. f.3, heavy rain, 29.80; Kingston, N. f. 1, 29.85; ship near 18 N., 75 W., S.S.E. f. 5; Port-au-Prince, E. f.4, 29.89; Camaguey, E. f. 4, 29.86. Jul. 6, ship near 12 N., 82 W., N. f. 4, 29.74 (pressure too low); Cienfuegos, E. f. 4, 29.84; Camaguey, S.E. f. 4, 29.90; center of a low placed 21 N., 83 W. (too far west and probably too far north). Jul. 7, ship near 22 N., 86.7 W., N.E. f. 3; ship near 24 N., 84 W., S.E. f. 7, 29.83; Havana, E. f. 6, 29.82; ship near 16 N., 82.7 W., S.S.E. f. 5, 29.71 (pressure too low). Jul. 8, ship near 23 N., 91 W., N.E. (no speed given), 29.77 (probably too low); Merida, calm; ship near 20 N., 85 W., S.S.E. f. 5; ship near 25 N., 84 W., S.E. f. 6, 29.88; ship near 27 N., 86 W., E.S.E. f. 6, 29.86; center of a low placed over Yucatan (probably too far south). Jul. 9, ship near 27 N., 89 W., E.N.E. f. 11, 29.74; ship near 24 N., 87 W., S.S.W. f. 4, 29.91; ship near 22 N., 92 W., W.S.W. f. 2, 29.83; center of a low placed 25 N., 91.5 W. (probably a little too far west). Jul. 10, Corpus Christi, W.S.W. f. 4, 29.77; Galveston, S.S.E. f. 6, 29.90; center of a low placed just N. of Corpus Christi (Historical Weather Maps, Jul. 1901). Author's note: Wind forces (f) are on Beaufort scale; pressures are in inches. 4) From a press bulletin released at 3:30 A.M. Jul. 10: The barometer is 29.78 (inches), the wind is 34 mph from the E., with occasional shifts to S.E. The east wind for the last 2 days has banked up the water and the tide is running quite high, but no swells are breaking in over the beach. The water is up to Avenue O and Twenty-fifth Street. At 9:30 A.M. the following information was given out: Tide has receded 3 feet and is now stationary. At 3 P.M. the following bulletin was issued: Conditions less threatening, tide 2.5 feet and falling; disturbance apparently moving N. to the west of Galveston. I.M. Cline, Forecast Official, Weather Bureau, Galveston (Monthly Weather Review, Jul. 1901). 5) There are indications of a storm in the western Gulf of Mexico. Its direction and intensity cannot be ascertained but cautionary advices have been distributed along the Gulf coast (The New York Times, Jul. 10, 1901, p.3, col.5). Author's note: The above statement was probably issued in the evening of Jul. 9. 6) Steamship "El Rio" arrived (in New York) from New Orleans yesterday and brought the crew of the brig "L.F. Munson" which wrecked 100 miles N.W. of Dry Tortugas. On last Tuesday (Jul. 9) the crew was rescued by the "El Rio". The gale that wrecked the "Munson" came up on Sunday (Jul. 7). The brig, which was enroute from Mobile to Sagua la Grande, Cuba, sunk Tuesday morning (The New York Times, Jul. 13, 1901, p.2, col.3). 7) Storm of Jul. 10, 1901. Texas Upper

coast. Minor (Dunn and Miller, 1960). 8) Maximum wind velocities associated with this storm: Galveston, 40 mph; San Antonio, N.E. 42 mph and Corpus Christi, W. 28 mph, all of them being recorded on Jul. 10 (Monthly Weather Review, Jul. 1901). Map showing a track for this storm. Morning positions along the track are: Jul 5, near 19 N; 77.5 W.; Jul. 6, near 21 N., 82 W.; Jul. 7, near 21.5 N., 84.5 W.; Jul. 8, near 22 N., 87 W.; Jul. 9, near 24.5 N., 91.7 W.; Jul. 10, near 27 N., 95 W. (Monthly Weather Review, Jul. 1901). 10) A storm was first observed near 13 N., 61 W. on Jul. 2, 1901 and lasted 8 days; it was last observed near 29 N., 96 W. (Mitchell, 1924). Author's note: Tannehill (1938) showed a track which is similar to the one displayed in Mitchell (1924). Both tracks are also similar to the one in Neumann et al. (1993).

On the basis of information in the above items a series of modifications was introduced along the track for Storm 2, 1901 in Neumann et al. (1901), which was started on Jul. 2. Based on information for Jul. 1 and 2 (item 3), the track in Neumann et al. (1993) was extended backwards to Jul. 1 and adjusted to the south early on Jul. 2. The author's 7 A.M. estimated positions were near 9.0 degrees N., 54.0 degrees W. and near 11.5 degrees N., 58.7 degrees W. for Jul. 1 and Jul. 2, respectively. Based on information for Jul. 3 in item 3), the author's 7 A.M. Jul. 3 position was estimated near 15.3 N., 65.7 W., which is about 130 miles to the N. of the corresponding position in Neumann et al. (1993). Based on information in items 1) through 3) and item 9), the track over the western Caribbean Sea was adjusted northward by roughly 200 miles over the period Jul. 4-7. As a result of a careful analysis of the content of the above mentioned items, the author of this study estimated the following 7 A.M. positions: Jul. 4, near 17.0 degrees N., 72.5 degrees W.; Jul. 5, near 18.7 degrees N., 76.5 degrees W.; Jul. 6, near 19.7 degrees N., 80.3 degrees W.; Jul. 7, near 21.5 degrees N., 83.5 degrees W. The author's estimated positions were 23.0 degrees N., 87.0 degrees W. and 25.3 degrees N., 90.5 degrees W. for Jul. 8 and Jul. 9, respectively; these positions were based on information in item 3) and were found to be about 90 miles to the N.N.E. of the position in Neumann et al. (1993) for Jul. 8 and about 50 miles to the E.N.E. of the position for Jul. 9 in the above publication. The 7 A.M. Jul. 10 position in Neumann et al. (1993) was found to be reasonable and was kept unmodified. The author's track for Storm 2, 1901 is displayed in Fig. 1.

The tropical storm status which Neumann et al. (1993) gave to this storm was found to be supported by the gale reported by the lightship "Flummense" (item 1), the wind E. f. 9 reported at Port-au-Prince on Jul. 4 (item 3), a ship observation reporting a wind E.N.E. f. 11 in the Gulf of Mexico (item 3) and the maximum wind velocities of E. 40 mph at Galveston and N.E. 42 mph reported on Jul. 10. The characterization of the weather system as a shallow depresison might have been correct while it was moving over the eastern Caribbean Sea but might have underestimated the storm structure over the northwestern Caribbean Sea and, particularly, over the Gulf of Mexico, where a fully developed storm causing a wind E.N.E. f. 11 and a central pressure lower than 29.74 inches (item 3) was reported.

Storm 3, 1901 (Jul. 4-13), H.

The following information was found in connection with this storm: 1) It appeared over the eastern Caribbean on Jul. 6, passed on a N.W. course S. of Puerto Rico on Jul. 7, causing a wind velocity of 56 mph at San Juan, skirted the eastern Bahamas on Jul. 8-9, arrived off the North Carolina coast on Jul. 10 and acquired marked intensity during the night of Jul. 10 when a maximum velocity of 64 mph was reported at Hatteras, N.C. After the morning of Jul. 11 the storm diminished rapidly in energy (Monthly Weather Review, Jul. 1901). Author's note: A shorter version of the above statement was reproduced in Tannehill (1938). 2) According to Edwin C. Thompson, director of the Weather Bureau Office at San Juan, "between the days Jul. 6-7 passed the island (of Puerto Rico) a thunderstorm accompanied by strong winds and rain". As referred to in the works of C.L. Mitchell and I. Tannehill, "it appeared to the N.W. of Barbados on Jul. 5, it took the normal direction to the N.W., passing between St. Lucia and Martinique and, while crossing over the N.E. Caribbean Sea, its effects were felt to the S.W. of the other Leeward Islands, causing considerable damage at St. Kitts; then turned more to the west, passing to the south and near Puerto Rico in the direction of the Mona Passage". According to records of the Weather Bureau Office at San Juan, the maximum velocity was N.E. 52 mph between 2 and 3 P.M. Jul. 7 (?) and the barometric pressure was 29.60 inches. La Democracia, a newspaper published in Caguas, said on Jul. 8 that "yesterday (Jul. 7) we had a rainy day with heavy showers since the early morning to about 9 P.M." and on Jul. 10 stated that "after passing to the west of Puerto Rico, (the bad weather) moved toward the N.E. portion of the Dominican Republic, passing near its coast. The storm in Puerto Rico was not mentioned by most newspapers and apparently it did not even reach the category of "una tormenta platanera", a rather weak storm (Salivia, 1972). Author's note: This storm is known in Puerto Rico as the one of San Cirilo. The time of occurrence of the maximum wind of 52 mph at San Juan in the afternoon of Jul. 7 is questionable because it contradicts other data about the storm passage over and near Puerto Rico, including the one indicating that "it passed over the island between the days Jul. 6-7". 3) Storm of Jul. 7, 1901 in the Dominican Republic, known as San Cirilo (Garcia-Bonnelly, 1958). 4) During Saturday night (Jul. 6) a storm of fair proportions passed over Puerto Rico, causing a maximum velocity of 56 mph from the S.E. and advisory notices thereto were distributed in the Bahamas, the Lesser Antilles and Florida (The New York Times, Jul. 8 1901, p.2, col.6). Author's note: The above statement suggests that the maximum wind from the S.E. was recorded at San Juan during the night of Jul. 6-7 or during the early part of Jul. 7, which is in contradiction with information in item 2). 5) Belen College Observatory, Jul. 8, 9 A.M. According to a cablegram from our distinguished friend Mr. Mason, there was a tempest at St. Thomas last Saturday (Jul. 6). The barometer has dropped from yesterday to today at Santiago de Cuba; calm and quiet seas were reported from Holland Bay (Jamaica). The center of the tempest will probably pass at a considerable

distance E. of the Bahamas. L. Gangoiti, S.J. (Diario de la Marina, Jul. 8, 1901, evening edition, p.2, col.2). Author's note: Father Lorenzo Gangoiti was the director of the Observatory and Mr. Mason was the weather observer at Santiago de Cuba. 6) Data for 8 A.M. (E.S.T.) extracted from Historical Weather Maps: Jul. 4, Barbados, N.N.E. f. 2, 29.88; ship near 11 N., 56 W., S.S.E. f. 3, 29.88; ship near 9.7 N., 52 W., S.S.W. f. 2, rain; ship near 8 N., 53 W., S.S.W. f. 3, 29.86. Jul. 5, Barbados, S.W. f. 3, 29.82; ship near 13.8 N., 58.8 W., S.E. f. 8, 29.83. Jul. 6, Dominica, S.E. f. 5, 29.87; St. Kitts, S.E. f. 6, 29.92; San Juan, E. f. 4, 29.93; Santo Domingo, N. f. 2, 29.95. Jul. 7, San Juan, S.E. f. 5, rain, 29.92; Santo Domingo, N. f. 3, 29.88; Turk Is., E. f. 4, 29.96; ship near 15 N., 64.7 W., S.S.E. f. 5, 29.88 (position questionable). Jul. 8, Turk Is. S.S.E. f. 5, 29.96; Port-au-Prince, E.N.E. f. 8 (?), 29.87; ship near 24 N., 93.8 W., W.N.W. f. 6; ship near 27 N., 73 W., E. f. 5, 29.97; ship (or station) near 25 N., 76 W., E.N.E. f. 4, rainshowers, 29.88; center of a low placed 15.5 N., 74.5 W. (wrong position; the right position seems to be near 24.5 N., 73.3 W.). Jul. 9, ship near 28 N., 77.7 W., W. f. 4., 29.88; ship near 30 N., 79 W., N. f. 5; ship near 31 N., 75 W., S.E. f. 6, 30.03 (pressure probably too high); ship near 32 N., 76 W., E.S.E. f. 6, rain, 29.68 (probably too low); center of a low placed 30.5 N., 77 W. Jul. 10, Hatteras, N.N.W. f. 9, 29.84; Norfolk, N.N.E. f. 4, 30.00; ship near 37 N., 71 W., E. f. 6, drizzle, 30.03; ship near 34 N., 71 W., S. f. 8, 29.91; center of a low placed 35 N. 73.3 W. (maybe a little bit far E.). Jul. 11, Hatteras, S.S.E. f. 5, 29.44; Norfolk, N.E. f. 5, 29.77; Wilmington, W. f. 4, 29.84; ship near 33 N., 76 W., W.S.W. f. 7, 29.83; center of a low placed just W. of Hatteras. Jul. 12, Wilmington, N.N.E. f. 4, 29.66; Hatteras, S.E. f. 4, 29.82; ship near 32 N., 77 W., S.W. f. 8, 29.80; ship near 34 N., 74.8 W., S. f. 8, 29.83; center of a low placed 33 N., 77.5 W. Jul. 13, Wilmington, S. f. 4, heavy rain, 29.76 (pressure not clearly read off the map); center placed just W. of Wilmington. Jul. 14, center could not be identified (Historical Weather Maps, Jul. 1901). Author's note: Wind forces (f) are on Beaufort scale and pressures are in inches. 7) Minimum pressure at Hatteras was 29.43 inches and the maximum wind velocity was 62 mph from the W. (Weather Bureau, 1902). Author's note: The above parameters occurred on Jul. 11. 8) Other maximum velocities were as follows: Raleigh, S.E. 24 mph on Jul. 13; Wilmington, 30 mph on Jul. 13; Charleston, S.W. 32 mph on Jul. 14; Columbia, S.W. 36 mph on Jul. 14 (Monthly Weather Review, Jul. 1901). 9) Quoting from works by C.L. Mitchell and I. Tannehill, the storm "entered North Carolina on Jul. 11 and on Jul. 12 recurved towards the S., against normalcy, and then turned to the W. over that State. The curve that it described from Jul. 10 to Jul. 13 was rare and has called much attention" (Salivia, 1972). 10) Storm of Jul. 10, 1901. North Carolina. Minimal. Minor damage (Dunn and Miller, 1960). Author's note: The storm also affected North Carolina during the next few days. 11) Map showing a partial track for this storm. Morning positions along the track were: Jul. 8, near 21 N., 73.5 W.; Jul. 9, near 25.3 N., 76 W.; Jul. 10, near 33.5 N., 75.5 W. (Monthly Weather Review, Jul. 1901). Author's note: Positions for Jul. 8-9 were found to be in serious error. 12) A storm was first observed

near 14 N., 61 W. on Jul. 5, 1901 and lasted for 8 days; it recurved near 30 N., 76 W. and it was last observed near 34 N., 79 W. (Mitchell, 1924). Author's note: The track displayed in the above publication is quite similar to those in Tannehill (1938) and Neumann et al. (1993).

The information contained in the above items suggests that some modifications along the storm track in Neumann et al. (1993) were in order. Based on information for Jul. 4 in item 6), the author of this study decided to start his track with a position near 11.0 degrees N., 56.3 degrees W. at 7 A.M. Jul. 4, which is one day earlier than along the track in Neumann et al. (1993). Based on information for Jul. 5 in item 6), the 7 A.M. Jul. 5 position in the above publication was adjusted to the E. by about 75 miles to near 13.7 degrees N., 59.7 degrees W.; however, the 7 A.M. Jul. 6 position in said publication was found to be reasonable and, therefore, was kept unchanged. On the basis of data for Jul. 7 in item 6) and after taking into account information in items 2) through 5), the author decided to adjust the 7 A.M. Jul. 7 position in Neumann et al. (1993) by about 180 miles to the N.W. to near 19.0 degrees N., 69.0 degrees W. The author's 7 A.M. Jul. 8 position was estimated near 24.5 degrees N., 73.3 degrees W., based on a ship reporting a W.N.W. wind force 6 on the Beaufort scale a short distance to the S.W. of that location in the morning of Jul. 8 (item 6) and also on space-time continuity; this position was found to be about 50 miles to the N.W. of the corresponding one in Neumann et al. (1993). On the basis of information for Jul. 9 in item 6), the author adjusted the 7 A.M. Jul. 9 position in the above publication by about 70 miles to the W.N.W. to near 30.5 degrees N., 76.7 degrees W.; the 7 A.M. Jul. 10 position was also slightly adjusted to the N. to near 35.0 degrees N., 73.7 degrees W. on the basis of information in item 6). Positions for 7 A.M. Jul. 11 and 7 A.M. Jul. 12 in Neumann et al. (1993) were kept unmodified, but their 7 A.M. Jul. 14 position was adjusted northward by about 45 miles to near 34.5 degrees N., 79.5 degrees W. in order to fit the S. f. 4 wind reported at Wilmington (item 6) and, in addition, information in item 9) indicating that the storm turned to the west over North Carolinas and not over South Carolina. The author's track for Storm 3, 1901 is shown in Fig. 1.

The hurricane status that Neumann et al. (1993) gave to this storm could not be rigorously verified, but the maximum winds ranging from 62 to 64 mph from the W. at Hatteras (items 1 and 7) allowed one to infer the existence of winds reaching hurricane intensity to the N. of the westward-moving center. However, indications are that the wind reached hurricane force only on Jul. 10 and early Jul. 11 and, consequently, the author of this study indicated hurricane status along the track only on those days. This treatment was found to differ from the one in Neumann et al. (1993) which carried the storm as a hurricane from the time it was still to the S. of Puerto Rico. Most likely, the Gulf Stream played a crucial role in causing a very significant intensification as the storm approached the North Carolina coast.

Storm 4, 1901 (Aug. 2-18), H.

The following information was found in relation to this storm:

1) It was chartered far to the N.E. of Puerto Rico, whence it moved in a direction slightly S. of due W., reaching Florida on Aug. 10. It passed into the Gulf S. of Tampa on the early morning of Aug. 11 and moved slowly through the N.E. Gulf. In Florida the storm was of slight intensity; it increased while crossing the Gulf and was attained by hurricane winds on the Louisiana coast. At Port Eads the wind reached a velocity of 72 mph. The anemometer cups were blown away and the anemometer support thrown down. High tides accompanied the storm. The storm warning displayman at Pilottown, La. reported that the tide on Aug. 14 rose 4 feet in 10 minutes (Tannehill, 1938). Author's note: In contrast with the early description of the disturbance stated above, the Monthly Weather Review, Aug. 1901 indicated that it first appeared as a feeble disturbance in the subtropical region N. of Cuba and that by the morning of Aug. 10 had advanced to the extreme S. of the Florida peninsula. 2) Information extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Aug. 2, ship near 32 N., 42 W., N.N.W. f. 4; ship near 33 N., 35 W., S.E. f. 4, 30.12; possible center (not drawn) 32 N., 40 W. Aug. 3, ship near 29 N., 47 W., W. f. 4, rain; possible center 30 N. 45 W., inferred from curvature of isobars. Aug. 4, ship near 26 N., 50.7 W., S.W. f. 4; ship near 28 N., 48 W., N.E. f. 4, 29.94; ship near 30 N., 50 W., S.S.E. f. 1, 29.91 (position was probably wrong because a temperature of 60 degrees F. was reported); possible center 27 N., 50 W., inferred from curvature of isobars. Aug. 5, ship near 23 N., 56 W., S.W. f. 4; possible center 24.5 N., 56.5 W., inferred from curvature of isobars. Aug. 6, ship near 20 N., 60 W., S. f. 4; ship near 22 N., 58 W., S.E. f. 6, 30.06; center (not drawn) might have been near 23 N., 61.5 W. Aug. 7, ship near 25 N., 69 W., S. f. 1, 30.00; ship near 24.8 N., 68 W., S.W. f. 2, 30.09; ship near 27 N., 68 W., E. f. 4, 30.06; ship near 26 N., 73 W., N.E. f. 2; ship near 27 N., 72 W., E.N.E. f. 2, 30.03; weak center inferred near 25 N., 69 W. Aug. 8, ship near 25 N., 76.7 W., N.W. f. 2, 29.94; ship near 24 N., 74 W., S.W. f. 4, 30.00; ship near 28.7 N., 73.7 W., N.E. f. 4, 30.09; ship near 26 N., 70 W., S. f. 2, 30.00; ship near 29 N., 69 W., S.E. f. 3, 30.09; center placed 25.5 N., 74.5 W. Aug. 9, Jupiter N.E. f. 3, 30.02; ship near 25 N., 80 W., N. f. 4, 30.06; Key West, N.N.E. f. 2, 30.03; ship near 29 N., 79 W., N.E. f. 2; ship near 28 N., 74 W., S.E. f. 4, 30.06; ship near 24 N., 74 W., S.S.E. f. 5, 30.06; center placed 24.5 N., 77 W., just S.E. of Nassau. Aug. 10, ship 24 N., 74 W., S.S.W. to S. f. 6, 30.06; Jupiter, N.E. f. 4, 29.93; Key West, S.W. f. 4, 29.99; Tampa, N. f. 3, 30.01; ship near 25 N., 84 W., N.W. f. 2, 30.06; center placed near Miami. Aug. 11, ship near 25 N., 85 W., S.W. f. 6, 29.97; Key West, S. f. 3, 29.97; Jupiter, S.S.E. f. 5, heavy rain, 29.96; ship near 27 N., 79 W., S.S.E. f. 5, 30.00; Tampa, N.N.E. f. 3, 29.89; center placed 27 N., 82 W. Aug. 12, Tampa, E. f. 4, 29.91; Jupiter, S. f. 2, 29.97; Key West, S. f. 3, 29.96; Port Eads, N. f. 3, 29.92; Pensacola, N.E. f. 2, 29.94; ship near 24 N., 87 W., N.W. f. 5, 29.86; ship near 28 N., 89 W., N.N.W. f. 7, lightning; center placed 26 N., 85 W. Aug. 13, Port Eads, N.E. f. 3, 29.83; Pensacola, N.E. f. 3, 29.90; Tampa,

S.E. f. 3, 29.94; Key West, S. f. 3, 29.97; ship near 25 N., 85 W., S. to S.S.W., f. 7, 29.68; ship near 27.8 N., 88 W., N. f. 7, 29.71; center placed 26.3 N., 86 W. (maybe a bit too far E.). Aug. 14, Port Eads, S.E. f. 9, 29.51; New Orleans, N.E. f. 3, rain, 29.72; Pensacola, S.S.E. f. 5, 29.85; ship near 27 N., 87.7 W., S. f. 8, 29.59; center just S.W. of Port Eads. Aug. 15, data difficult to read; however, N.E. wind very strong at New Orleans and S.E. at Pensacola; center probably S.E. of New Orleans. Aug. 16, center over S.W. Alabama. Aug. 17, center over extreme N. Arkansas. Aug. 18, center (extratropical low) near 39 N., 88 W. (Historical Weather Maps, Aug. 1901). Author's note: Wind forces (f) are on Beaufort scale; pressures are in inches. 3) The gale of Sunday (Aug. 11), while the severest in several months, dealt lightly with the West coast (of Florida). Reports from Miami, however, indicate that considerable damage was done by the wind along the East coast. Boats remained at their berths along both coasts yesterday, with few exceptions, as there was warning of continued storm (The Morning Tribune, Tampa, Aug. 13, 1901, p.1, col.2). 4) Belen College Observatory, Aug. 12, 11:40 A.M. According to our observations and cablegrams (received), a moderate depression was over the Bahamas on Saturday (Aug. 10). The upper and mid-level currents were then weak, but today they are more intense. The center of circulation is now apparently to the N.W. (of Havana) over the Gulf and its influence extends from the central Gulf of Mexico to the southern States of the continent, which will suffer its effects. L. Gangoiti, S.J. (Diario de la Marina, Havana, Aug. 12, 1901, evening edition, p.2, col.2). 5) Belen College Observatory, Aug. 14, noon. The cyclonic perturbation is almost stationary to the S. of New Orleans and Galveston, with an increase in intensity since yesterday and it is probably getting ready for its recurvature. L. Gangoiti, S.J. (Diario de la Marina, Havana, Aug. 14, 1901, evening edition, p.2, col.2). 6) The captain of the steamship "Espana" reported that he first encountered the storm in the Gulf Monday Aug. 12 at 2:30 P.M. with 20-30 mph winds which gradually increased through Thursday (Aug. 15), the barometer falling all the while. The maximum was reached between 2 and 7 P.M. Thursday, with estimated winds of 60-70 mph from the S.E. The Gulf was very rough and waves broke over the funnels and it was so much spray that it was impossible to see where the boat was going. The boat reached Mobile Friday morning, Aug. 16 (Monthly Weather Review, Aug. 1901). 7) At New Orleans at 8 P.M. Aug. 14 the barometer was 29.65 inches and the wind blew at 24 mph from the N.E. From midnight Aug. 14-15 to 8 A.M. Aug. 15 the wind blew 20-35 mph from the N.E., the barometer reaching a minimum of 29.41 inches at 9 A.M., and by 8 P.M. had risen to 29.57 inches. About 10 A.M. Aug. 15 the wind backed to N. with occasional wind gusts from N.E. until about midday; then blew from N.N.W. until about 3:45 P.M. and the remaining of the day from the N.W. There was a severe squall at 9:35 A.M. during which the wind reached a velocity of 49 mph from the N.E. By 7 A.M. Aug. 14 the wind at Port Eads had changed from N.E. to S.E. by the way of E., indicating that the storm has moved westward from that place. At 8 P.M. Aug. 14, a report was filed at the telegraph office by the displayman but was never sent. The message showed that the barometer was 29.50 inches, the wind 60 mph

from the S.E. and that sometime during the day the wind had reached a maximum velocity of 72 mph from the N.E. (Monthly Weather Review, Aug. 1901). Author's note: The above information was extracted from reports by I.M. Cline and H.F. Alciatore of the New Orleans office of the Weather Bureau. 8) At Mobile the barometer read 29.74 inches at 8 A.M. Aug. 15, 29.65 inches at noon, 29.50 inches at 4 P.M., 29.34 inches at 6 P.M., 29.32 inches from 6:30 to 8 P.M. and 29.33 inches at 9 P.M. The storm was most severe from 5:15 to 6:30 P.M. and the time of highest velocity was 5:50 P.M. when a maximum of 60 mph from the S.E. and an extreme of 78 mph occurred. The wind averaged 50-60 mph from 5 to 7 P.M., when the wind shifted to S. and showed as gradual decrease to S.W. 22 mph at midnight Aug. 15-16. At 3:30 P.M. the water was 5 feet above the wharf and continued to rise until 7 P.M. and then fell at a rate of about 1 foot an hour (Monthly Weather Review, Aug. 1901). Author's note: The above information was extracted from a report by William M. Dudley of the Mobile office of the Weather Bureau. 9) New Orleans, Aug. 15. The storm which has been sweeping the Gulf coast westward from Pensacola the last 2 days has prostrated telegraph and telephone wires but the Picayune had a statement from a man who left here at 2 o'clock yesterday. He is at Buras, 60 miles down the river from here, and described the storm which swept Port Eads as a tidal wave similar to the one of 1893. A house of a man named Cofden, half a mile above the Quarantine Station, was swept away and 15 members of his family were drowned (The New York Times, Aug. 16, 1901, p.1, col.5). Author's note: The above dispatch mentioned, in addition, that several boats were lost. 10) New Orleans, Aug. 17. Dr. Isaac Cline of the Weather Bureau received today from the weather observer at Port Eads a report stating that the wind on Wednesday (Aug. 14) carried away the anemometer cups. The highest velocity, taken before the anemometer malfunctioned, was 72 mph (The New York Times, Aug. 18, 1901, p.1, col.3). 11) Atlanta, Ga. The tropical storm has tonight (Aug. 15) completely cut off Mobile from the world. At 6 P.M. a communicate was obtained with Mobile for a few minutes. The Associated Press operator made his way to the office in a boat. He took up a position on top of the switchboard and sent a message indicating that the water was 3 feet deep in the room and that was still rising (The New York Times, Aug. 16, 1901, p.1, col.5). 12) Mobile, Aug. 17. The front advices from the lower bay and Fort Morgan came today by the U.S Quartermaster's ship "Poc". For 3 hours the wind blew at a rate of 60 mph at the fort (The New York Times, Aug. 18, 1901, p.1, col.3). 13) Minimum pressure at New Orleans was 29.37 inches and the maximum wind velocity was N.E. 49 mph on Aug. 15. At Mobile, the minimum pressure was 26.26 inches and the maximum wind velocity was S.E. 60 mph on Aug. 15 (Weather Bureau, 1902). Author's note: The above pressure values were apparently taken at station level, without making the standard reduction to sea level. This is probably why they are lower than the respective values of 29.41 inches and 29.32 inches given for New Orleans and Mobile in items 7) and 8). 14) Pensacola reported a maximum velocity of S.W. 70 mph on Aug. 15 (Monthly Weather Review, Aug. 1901). 15) Storm of Aug. 10-15. Minor in the Straits of Florida and N.W. Florida; wind 70 mph at Pensacola. Minimal from the Mississippi delta to Mobile; considerable loss of life (Dunn

and Miller, 1960). 16) Map showing a track for this storm, starting near Camaguey (Cuba) in the morning of Aug. 9 and displaying positions near Jupiter and Tampa on Aug. 10 and Aug. 11, respectively, off the Louisiana coast near the 90 degrees W. meridian on Aug. 14 and just E. of New Orleans on Aug. 15. The track ended over the lake region on Aug. 19 (Monthly Weather Review, Aug. 1901). 17) A storm was first observed near 26 N., 50 W. on Aug. 4, 1901 and lasted 14 days; it recurved near 26 N., 90 W. and it was last observed near 42 N., 83 W. (Mitchell, 1924). Author's note: The corresponding track in Mitchell (1924) was found to be similar to the ones in Tannehill (1938) and Neumann et al. (1993).

Information in the above items allowed the author of this study to introduce some modifications along the track for Storm 4, 1901 which is displayed in Neumann et al. (1993). The track, which these authors started on Aug. 4, was extended backwards to Aug. 2 and new estimates for 7 A.M. positions were made for the period Aug. 4-8. The author's 7 A.M. positions for Aug. 2-8 were as follows: Aug. 2, near 32.0 degrees N., 40.0 degrees W.; Aug. 3, near 30.0 degrees N., 45.0 degrees W.; Aug. 4, near 27.0 degrees N., 50.0 degrees W.; Aug. 5, near 24.5 degrees N., 56.5 degrees W.; Aug. 6, near 23.7 degrees N., 62.3 degrees W.; Aug. 7, near 25.0 degrees N., 69.0 degrees W.; Aug. 8, near 25.5 degrees N., 74.0 degrees W. The above positions were based on information in item 2) and on space-time continuity which, in some cases, helped obtaining a smooth track. Differences between positions along this track and the respective ones in Neumann et al. (1993) were found to range from about 140 miles on Aug. 6 to just a few miles on Aug. 7. 7 A.M. positions for Aug. 9-10 in Neumann et al. (1993) were kept unchanged, but the 7 A.M. Aug. 11 position was slightly adjusted to the W.N.W. to fit better information in items 1) and 2). The 7 A.M. Aug. 12 position in Neumann et al. (1993) was kept unchanged, but their 7 A.M. Aug. 13 position was adjusted eastward by about 40 miles to near 27.5 N., 86.7 W in order to fit better information in item 2). Similarly, the 7 A.M. Aug. 14-16 positions in Neumann et al. (1993) were adjusted to near 28.7 degrees N., 89.7 degrees W., to near 30.0 degrees N., 89.0 degrees W. and to near 32.0 degrees N., 88.0 degrees W. to fit better information in items 2) and 7), in items 7) and 8) and in item 2), respectively. Finally, 7 A.M. positions in Neumann et al. (1993) for the period Aug. 17-18 were kept unchanged. The author's track for Storm 4, 1901 is shown in Fig. 1.

The hurricane status that Neumann et al. (1993) gave to this storm was verified by the content of several of the items above. As in Neumann et al. (1993), such hurricane intensity was denoted along the track starting on Aug. 12; prior to that day a tropical storm status was indicated in spite of that the author believes that it is likely that storm status was not reached until Aug. 9 when the weather system was over the Bahamas. Once the system was over land over extreme western Alabama, the hurricane status was changed back to the one of tropical storm on Aug. 16, and the extratropical stage was introduced on Aug. 17.

The place or origin and early track of this storm were unusual for Aug. and suggested that it evolved from an initially

subtropical or extratropical system.

Storm 5, 1901 (Aug. 18-22), T. S.

This is a new storm case which the author of this study has recently documented and that, of course, is not included in Neumann et al. (1993). Strictly speaking, however, it is not a new case since its existence as a gale in the Lesser Antilles has been published in newspapers before and even shown on weather maps.

Documentation of this case was based on the following information: 1) New York, Aug. 21. According to intelligence from St. Thomas, a severe gale has been raging at Barbados and other islands. At St. Vincent the jetties and the vessels lying there are reported to have been destroyed (The Times, London, Aug. 22, 1901, p.3, col.3). 2) The Press Association states that with reference to the reported hurricane in the West Indies, the West Indian Committee has a reassuring telegram from Barbados to the effect that there has been no damage, but there has been a gale of wind and heavy rain throughout the islands (The Times, London, Aug. 23, 1901, p.3, col.2). 3) Lloyd's agent at Barbados telegraphs under date Aug. 22. Severe storms on the coasts but no serious harm has been done to shipping. No damage on land. Schooner "Myosettis" has been totally lost, all on board saved. Three lighters with cargo from steamer "Para" have gone ashore and become wrecks (The Times, London, Aug.23, 1901, p.3, col.2). 4) Telegram from the Governor of the Windward Islands: "Heavy gale passed Grenada and St. Vincent. No damage Grenada, no lives lost. No news from St. Lucia" (The Times, London, Aug. 27, 1901, p.3, col.4). 5) Information extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Aug. 18, Barbados, N.E. f. 3, 29.96; ship near 13 N., 58 W., E. f. 3, 29.97; ship near 9 N., 53 W., S.W. f.2, 29.97; ship near 8 N., 54 W., calm, 29.97. Aug. 19, Barbados, N.E. f. 2, 29.90; ship near 12 N., 58 W., N.N.W. f. 3, 29.86; ship near 8 N., 54 W., S. f.3, 29.91. Aug. 20, Barbados, S.E. f. 7, heavy rain, 29.83; Martinique, E.S.E. f. 8, 29.88; Dominica, E. f. 4, 29.87; Trinidad, S.W. f. 3, 29.90; ship near 9 N., 57 W., S.S.E. f. 4, thunderstorm; Curacao, E. f. 2, 29.90. Aug. 21, Barbados, S.S.E. f. 2, 29.89; Trinidad, S.S.E. f. 2, 29.90; Dominica, S.E. f. 4, 29.83 (probably too low); Curacao, S.E. f.3, 29.81. Aug. 22, Curacao, S. f. 1, 29.79 (Historical Weather maps, Aug. 1901). Author's note: Wind forces (f) are on Beaufort scale, pressures are in inches.

On the basis of information in the above items, item 5) in particular, the author of this study prepared a track for Storm 5, 1901. In obtaining such a track, the author also made use of space-time continuity, specially over the period Aug. 21-22. The following 7 A.M. positions were estimated along the author's track: Aug. 18, near 11.5 degrees N., 53.0 degrees W., Aug. 19, near 12.0 degrees N., 56.7 degrees W.; Aug. 20, near 12.3 degrees N., 60.3 degrees W.; Aug. 21, near 12.5 degrees N., 64.5 degrees W.; Aug. 22, near 12.7 degrees N., 69.5 degrees W. The author's track is displayed in Fig. 1.

The author of this study attributed the status of a tropical storm to this weather system. Such a classification was kept along the track over the period Aug. 18-20, although tropical storm winds

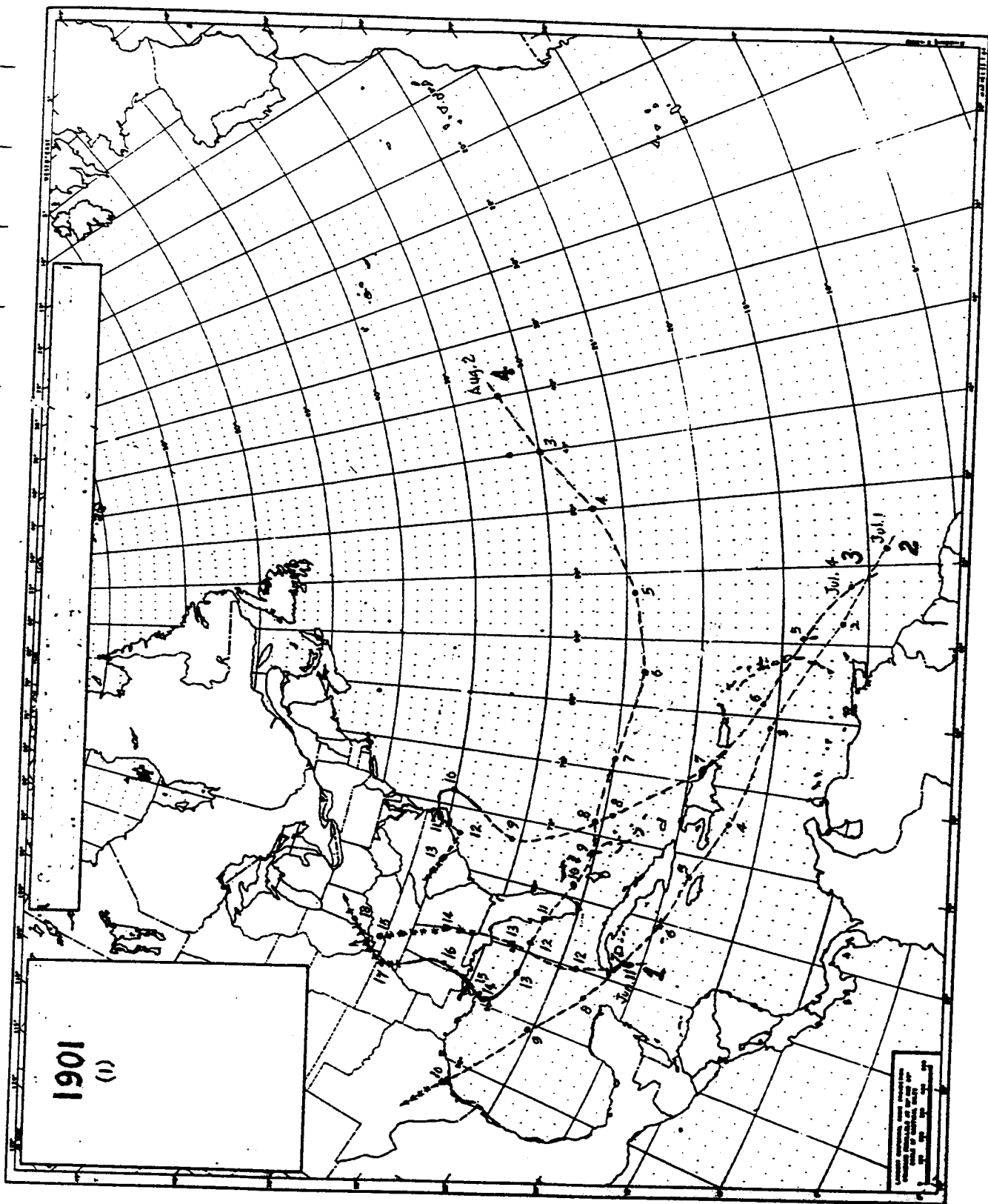


Fig. 1

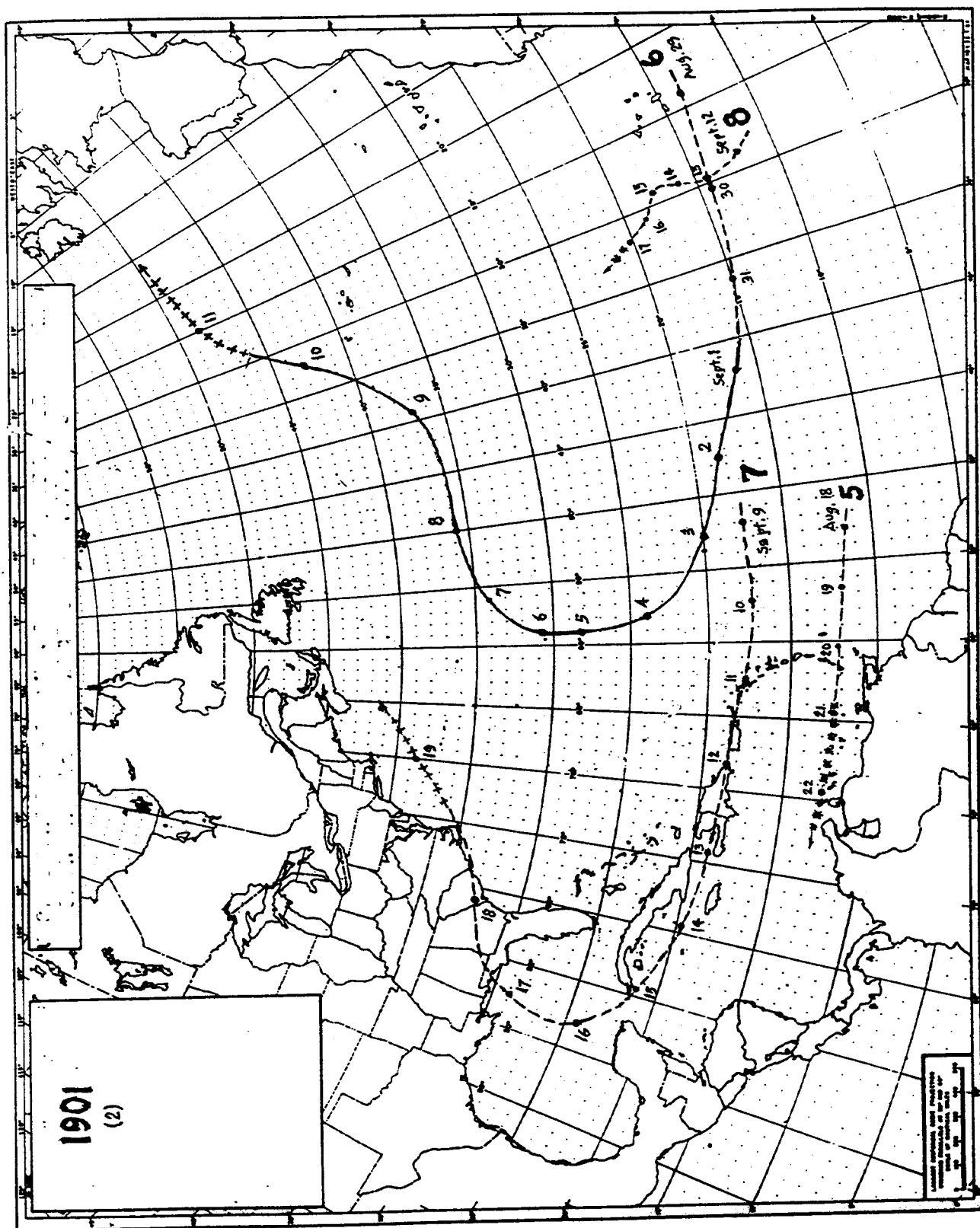


Fig. 1 (continued)

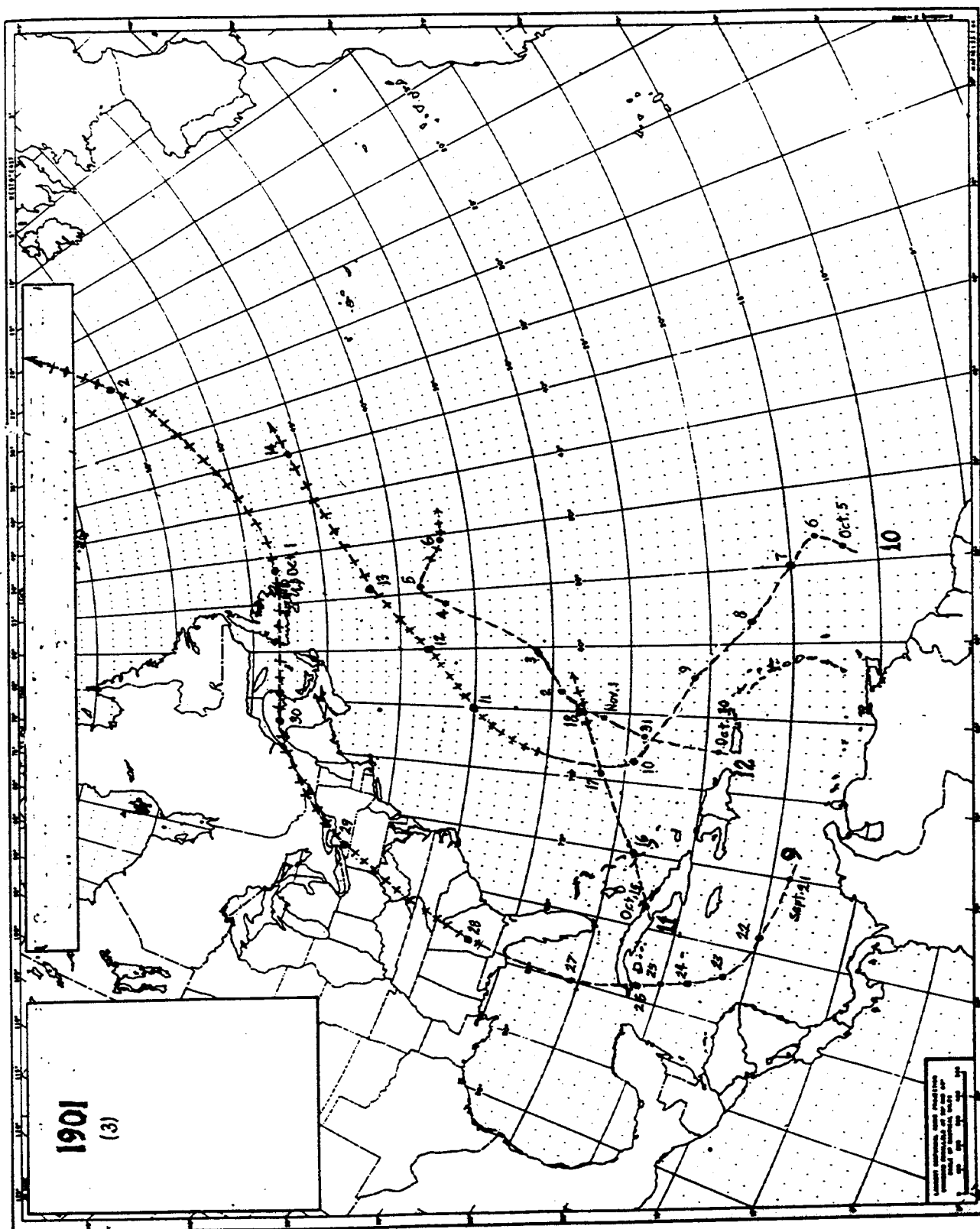


Fig. 1 (continued)

were only observed on the last day mentioned . A dissipating tropical depression stage was introduced on Aug. 21 and kept on Aug. 22. The basis for introducing dissipating conditions was that no evidence of the storm was found in the western Caribbean Sea where more abundant data (not shown) existed for Aug. 23 and subsequent days. Proximity to South America and relatively cold waters over the extreme southeastern portion of the eastern Caribbean Sea probably contributed to the storm weakening.

Storm 6, 1901 (Aug. 29- Sept. 11), H.

This is the same storm which Neumann et al. (1993) identify as Storm 5, 1901.

The following information was found in relation to this storm:

1) Data extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Aug. 29, Sao Vicente (Cape Verde Is.), N.E. f. 5, 29.80; ship near 14 N., 25 W., N.N.E. f. 6, 29.80; ship near 13 N., 26 W., W.N.W. f. 4, 29.94; ship near 7 N., 27 W., S.W. f. 4, 29.83; ship near 18 N., 25 W., N.N.E. f. 5, 29.71; center placed 15 N., 23 W. (maybe too far E.). Aug. 30, ship near 16 N., 27 W., S.S.E. f. 5, 29.77; ship near 17 N., 24 W., E.S.E. f. 5, 30.03 (too high); ship near 14 N., 25 W., S.W. f. 2, 29.88; ship near 11 N., 27 W., S.W. f. 6, 29.91; center placed 14.5 N., 30.5 W. Aug. 31, no data in vicinity where the storm was likely to have been (Historical Weather Maps, Aug. 1901). Author's note: Wind forces (f) are on Beaufort scale, pressures are in inches. 2) Data extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Sept. 1 and Sept. 2, no data were available near the storm. Sept. 3, ship near 18 N., 57 W., N.E. f. 4, 29.91; ship near 14 N., 50 W., S.W. f. 4, 29.97. Sept. 4, low placed near 25 N., 60 W. (probably too far N. and W.); E. and N.E. winds N. of the low; S. and S.W. winds S. of the low, reaching the Lesser Antilles. Sept. 5, ship near 29 N., 58 W., E. f. 7, 29.62 (pressure not clearly read off the map), ship near 28 N., 60 W., N. f. 8, 29.68; center placed 28.2 N., 58.8 W. Sept. 6, ship near 33 N., 60 W., N.N.E. f. 8, 29.59; ship near 27 N., 60 W., W.S.W. f. 7, 29.71; ship near 28 N., 62 W., W.N.W. f. 6, 29.83; center placed 30.5 N., 60 W. (probably too far west). Sept. 7, ship near 34 N., 50 W., S.S.E. f. 9, 29.91; ship near 37 N., 51 W., E.S.E. f. 9; ship near 37 N., 60 W., N.E. f. 6, 29.88; center placed 33.8 N., 55.8 W., pressure 995 millibars (29.38) indicated on the map. Sept. 8, ship near 36 N., 51 W., N.N.E. f. 10, 29.29; ship near 34 N., 48 W., S.S.W. f. 8, 29.26 (not clearly read off the map); ship near 36 N., 45 W., S.S.E. f. 6, 29.77; ship near 33 N., 53 W., W.N.W. f. 6, 29.91; ship near 31 N., 52 W. (position might be wrong), N.W. f. 11, 29.50; ship near 33 N., 47 W., S. f. 6, 29.65; center placed 35 N., 49 W. Sept. 9, ship near 37 N., 37 W., S. f. 2, 29.29; ship near 40 N., 40 W., E. f. 6, 29.50; ship near 35 N., 35 W., S. f. 9, ship near 33 N., 41 W., W.N.W. f. 8, 29.83; center placed 37 N., 39 W. Sept. 10, center near 43 N., 32 W. as inferred from the curvature of isobars, still ahead of a cold front associated with a low over S. Greenland. Sept. 11, frontal low placed 48 N., 25 W. (Historical Weather Maps, Sept. 1901). Author's note: Wind forces (f) are on Beaufort scale, pressures are in inches. 3) A storm was first observed near 14 N., 38 W. on Aug. 30, 1901 and lasted 14

days; it recurved near 32 N., 59 W. and it was last observed near 70 N., 12 W (Mitchell, 1924). Author's note: The track in Mitchell (1924) was found to be very similar to the one shown in Tannehill (1938). It was also found to be similar to that in Neumann et al. (1993), except for Sept. 10 when the latter track mentioned was found to be much farther to the west and having had the storm moving straightly to the N. and then abruptly to the N.E.

On the basis of information in items 1) and 2), some modifications were introduced along the track shown in Neumann et al. (1993 as for Storm 5, 1901. Such a track was extended backwards to the vicinity of the Cape Verde Islands as indicated by the first 7 A.M. position that the author was able to estimate near 13.7 degrees N., 24.0 degrees W. on Aug. 29. New 7 A.M. positions were estimated for the period Aug. 30- Sept. 6 as follows: Aug. 30, near 14.3 degrees N., 30.5 degrees W.; Aug. 31, near 15.0 degrees N., 36.3 degrees W.; Sept. 1, near 16.3 degrees N., 42.0 degrees W.; Sept. 2, near 18.5 degrees N., 47.5 degrees W.; Sept. 3, near 20.0 degrees N., 52.7 degrees W.; Sept. 4, near 24.0 degrees N., 58.0 degrees W.; Sept. 5, near 28.3 degrees N., 59.0 degrees W.; Sept. 6, near 30.7 degrees N., 59.0 degrees W. The differences of these positions with respect to the ones in Neumann et al. (1993) were found to range from approximately 450 miles on Aug. 30 to about 60 miles on Sept. 6. 7 A.M. positions for the period Sept. 7-9 in Neumann et al. (1993) were found to satisfy the information in item 2) for those days and, therefore, were kept unchanged; however, their 7 A.M. Sept. 10 position was adjusted by about 240 to the E. to near 43.0 degrees N., 32.0 degrees W. in order to fit information for that day in item 2). Finally, the 7 A.M. Sept. 11 position in Neumann et al. (1993) was kept unmodified. The author's track for Storm 6, 1901 is displayed in Fig. 1.

The hurricane status that Neumann et al. (1993) gave to this storm as for Storm 5, 1901 was found to be supported by pressures slightly below 29.30 inches reported by ships in spite of that the highest velocities reported were forces 10-11 on the Beaufort scale on Sept. 8 (item 2). Based on the available data it was not possible to determine the location along the track where the storm reached hurricane intensity; however, nothing was found indicating that this could not have occurred in the vicinity of the 40 degrees W. meridian as shown in Neumann et al. (1993) and, therefore, a hurricane status was denoted along the author's track starting on Sept. 1. The hurricane status was changed into the extratropical stage on Sept. 1 on the basis of information for that day shown in item 2).

Storm 7, 1901 (Sept. 9-19), T. S.

This is the same storm which Neumann et al. (1993) identify as Storm 6, 1901.

The following information was found about this storm: 1) A storm appeared near the island of St. Kitts on Sept. 11, moved thence westward over the north part of the Caribbean Sea from Sept. 12 to Sept. 15, recurved over the Gulf of Mexico and reached the middle Gulf coast by Sept. 7 and passed from that section northward off the South Atlantic coast of the U.S. While this disturbance was

lacking in the energy of a hurricane it was attained by high winds and heavy rain throughout its course (Monthly Weather Review, Sept. 1901). Author's note: Tannehill (1938) also gave a description of this storm adding that it passed inland near Pensacola. 2) Data extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Sept. 9, ship near 19 N., 52 W., E.N.E. f. 5, 29.91; ship near 16 N., 49 W., no wind given, 29.94. Sept. 10, St. Kitts, N.E. f. 4, 29.95; Dominica, N.W. f. 1, 29.93; San Juan, N.E. f. 4, 29.96; Barbados, W.S.W. f. 2, 29.94. Sept. 11, St. Kitts, N. f. 2, 29.86; Dominica, S. f. 4, 29.93; San Juan, N.E. f. 4, 29.95; Barbados, S.E. f. 3, 29.96. Sept. 12, San Juan, S.E. f. 8, rain, 29.84; ship near 20 N., 66 W., E. f. 9, 29.89; Santo Domingo, N.W. f. 4, 29.89; ship near 22 N., 66.8 W., E. f. 7; St. Kitts, E. f. 5, 29.98; ship near 20 N., 61.7 W., S.S.E. f. 8, 30.03; no center was drawn on the map but there was one near the N.W. coast of Puerto Rico or Mona Passage. Sept. 13, Port-au-Prince, S.E. f. 9, 29.86; ship off extreme E. of Cuba, N.E. f. 4, 29.80; Kingston, E. f. 1, 29.81; ship near 17 N., 76 W., N.E. f. 6, 29.83; Santo Domingo, S.S.E. f. 4, 29.93, rainfall in 24 hours: 5.09 inches. Sept. 14, Havana, N.E. f. 3, 29.89; Cienfuegos, N.E. f. 3, 29.82, Camaguey, E. f. 6, pressure could not be read; Kingston, S.S.E. f. 4, 29.88; center placed 20.5 N., 79 W. Sept. 15, Havana, E.S.E. f. 5, 29.85; ship near 23.8 N., 84.2 W., E. f. 8, 29.80; ship near 21 N., 86 W., W. to W.N.W. (wind force could not be read but not exceeding f. 3), 29.88; ship near 20 N., 86 W., W. f. 3, 29.80; center placed 21.5 N., 84.5 W. Sept. 16, ship near 26.7 N., 90 W., N.E. f. 5, 29.86; ship near 25 N., 84 W., S.S.E. f. 5, 29.97. Sept. 17, New Orleans, N.E. f. 3, 29.80; Pensacola, N.E. (wind force could not be read), 29.63 (pressure not clearly read off the map); ship near 26 N., 85 W., S.S.W. f. 6, 29.88; ship near 25 N., 85 W., S. f. 6; center placed 29 N., 87.5 W., 1000 millibar isobar (29.53) was drawn on map. Sept. 18, Charleston, S. (wind force could not be read), 29.77; other data difficult to read off the map; center appears to be just W. of Charleston. Sept. 19, extratropical low near 39 N., 70 W. (Historical Weather Maps, Sept. 1901). Author's note: Wind forces (f) are on Beaufort scale, pressures are in inches. 3) Belen College Observatory, Sept. 11, 5 P.M. It is inferred from cablegrams received this morning and afternoon that there are some indications of a cyclonic perturbation to the S.E. of St. Thomas. L. Gangoiti, S.J. (Diario de la Marina, Havana, Sept. 12, 1901, morning edition, p.2, col.5). 4) Belen College Observatory, Sept. 12, 11:20 A.M. A moderate tempest is being probably felt in Puerto Rico this morning. It appears to be of a weak barometric gradient and not much intensity up to the present time. Although it cannot be affirmed yet, its motion appears to be towards the W.N.W. L. Gangoiti, S.J. (Diario de Marina, Havana, Sept. 12, 1901, evening edition, p.2, col.1). 5) San Juan, P.R., Sept. 13. It is reported that half the coffee crop has been partially damaged by recent storms and that the banana crop has been seriously damaged as well. Telegraph communication with Mayaguez has been restored (The New York Times, Sept. 14, 1901, p.7, col.4). 6) This was the fourth time that a storm had visited Puerto Rico on the festivity of San Vicente (Sept. 11). The storm was of a short diameter and small violence and no casualties occurred. It passed along the northern

coast of the island between the night of Sept. 11 and the early morning hours of Sept. 12, when a wind velocity of 52 mph from the S.E. and a barometer reading of 29.57 inches were registered (Salivia, 1972). 7) Belen College Observatory, Sept. 13, 11:20 A.M. According to telegrams received, "Ciudad del Cabo" (probably Cap-Haitien on the northern coast of Haiti) had heavy showers since noon yesterday, strong gusts last night and light drizzle today. The easternmost portion of Cuba will be under the storm influence starting tonight. L. Gangoiti, S.J. (Diario de la Marina, Havana, Sept. 13, 1901, evening edition, p.2, col.2). 8) Belen College Observatory, Sept. 14, 10:40 A.M. Cienfuegos entered the area of low pressure late yesterday and Havana did it this morning after having an anticyclone for many days. At 6 P.M. yesterday, cumulus clouds corresponding to the hurricane bar were seen on the horizon, extending from the E.N.E. to the S.E. as observed from Havana. In our opinion the cyclonic center was between Jamaica and the S.E. of Grand Cayman 7 A.M. today, with less intensity than yesterday. L. Gangoiti, S.J. (Diario de la Marina, Sept. 14, 1901, evening edition, p.2, col.2). 9) According to the Weather Bureau the tempest is very strong and was located this morning near the southern coast of central Cuba. It will probably move towards the N.W. (Diario de la Marina, Havana, Sept. 14, 1901, evening edition, p.2, col.2). 10) Belen College Observatory, Sept. 16, 10 A.M. Direction changes of the low-level currents at Cienfuegos, Jovellanos and Havana were small Saturday (Sept. 14) indicating that the cyclonic vortex was moving at a good distance from the Cuban coast. Therefore, a message was sent to Pinar del Rio the morning of that day indicating that they would have strong winds from the N.E. to the S., as the storm passed S. and somewhat distant. At 6 A.M. yesterday (Sept. 15) the vortex was to the W.S.W. over the Yucatan Channel. At 6 A.M. this morning a cirrus arc was seen to the W. of Havana with its upper part about 40 degrees above the horizon and the vortex is now N.W. one quarter W., moving towards the Louisiana coast. L. Gangoiti, S.J. (Diario de la Marina, Havana, Sept. 16, 1901, evening edition, p.2, col.2). 11) Santiago (Cuba), Sept. 14. The worst cyclone in several years swept over this section last night. Two ships entered the harbor in distress but no serious damage is reported. Several lighters and small coasting schooners broke from their mooring and were driven into the mud across the bay. The small wharf at Daiquiri was completely demolished (The New York Times, Sept. 15, 1901, p.10, col.5). 12) Storm warning were displayed at Key West and Miami (The New York Times, Sept. 15, 1901, p.13, col.4). 13) Santa Clara, Sept. 17. Trinidad mayor informed of very heavy rain during all day and night yesterday, with strong gusts at times (Diario de la Marina, Havana, Sept. 17, 1901, evening edition, p.2, col.3). Author's note: The mayor's message was probably originated at Trinidad on Sept. 15. 14) Puerto Principe (Camaguey), Sept. 16. According to the mayor of Santa Cruz (del Sur), the tempest of Sept. 14 caused some damage but no casualties (Diario de la Marina, Havana, Sept. 17, 1901, evening edition, p.2, col.3). 15) Batabano, Sept. 15 (via telegraph). Strong wind and rain prevailed last night, continuing at daybreak today. The schooner "Rosalia" came ashore. The schooner "Isabelita" sank by the Horns wharf. Water in

Zanja and Progreso streets is about a yard deep, and it is even higher at other streets (Diario de la Marina, Sept. 16, 1901, evening edition, p.2, col.3). 16) Sept. 13-16, 1901. A moderate cyclone passed south of the island of Cuba to the Yucatan Channel. Some vessels were lost, and some significant damages occurred (Sarasola, 1928). Author's note: Actually taken from the catalog of Cuban cyclones by M. Gutierrez-Lanza, which is included in Sarasola (1928). Martinez-Fortun (1942) mentioned this storm only as a rain storm in Las Villas (central Cuba); it is obvious that he underestimated this weather system. 17) Lowest pressure at Pensacola was 29.57 inches; it was 29.66 at Mobile (Weather Bureau, 1902). 18) Some maximum wind velocities were as follows: Pensacola, S.E. 36 mph on Sept. 16; Jacksonville, S.W. 32 mph on Sept. 17; Savannah, S.W. 27 mph on Sept. 18; Augusta, N.E. 46 mph. on Sept. 18; Wilmington, S. 32 mph on Sept. 18; Hatteras, N. 43 mph on Sept. 19; Norfolk, N. 26 mph on Sept. 19; Cape Henry, N.E. 56 mph on Sept. 18 (Monthly Weather Review, Sept. 1901). 19) Storm of Sept. 17, 1901. Pensacola. Minor (Dunn and Miller, 1960). 20) Map showing a track for this storm. Positions along the track were near 19.3 N., 76.5 W. in the morning of Sept. 13; near 20.5 N., 80.5 W. in the morning of Sept. 14; near 21.5 N., 84.5 W. in the morning of Sept. 15; near 23.5 N., 87.5 W. in the morning of Sept. 16; near 27.5 N., 89 W. in the morning of Sept. 17; near Pensacola in the evening of Sept. 17; near Savannah in the morning of Sept. 18 and near Hatteras in the evening of Sept. 18 (Monthly Weather Review, Sept. 1901). 21) A storm was first observed near 18 N., 51 W. on Sept. 9, 1901 and lasted 10 days; it recurved near 27 N., 89 W. and it was last observed near 42 N., 65 W. (Mitchell, 1924). Author's note: The corresponding track in Mitchell (1924) was found to be similar to the one in Tannehill (1938) and did not differ greatly from the one in Neumann et al. (1993).

Based on information in the above items some modifications were introduced along the track in Neumann et al. (1993) which was drawn as for Storm 6, 1901 in their publication. The author of this study estimated new 7 A.M. positions for the period Sept. 9-11, primarily on the basis of information in item 2). These positions were as follows: Sept. 9, near 17.5 degrees N., 52.0 degrees W.; Sept. 10, near 17.3 degrees N., 57.3 degrees W.; Sept. 11, near 17.7 degrees N., 62.5 degrees W.; these positions ranged from about 100 to about 75 miles to the S.W. of the ones in Neumann et al. (1993). The 7 A.M. Sept. 12 position in the above mentioned publication was found to be reasonable on the basis of information in items 2) and 6) and, therefore, was kept unchanged. The author of this study estimated new 7 A.M. positions for the period Sept. 13-17 as follows: Sept. 13, near 19.0 degrees N., 74.3 degrees W.; Sept. 14, near 19.7 degrees N., 79.5 degrees W.; Sept. 15, near 21.5 degrees N., 84.5 degrees W.; Sept. 16, near 24.3 degrees N., 88.0 degrees W.; Sept. 17, near 29.0 degrees N., 87.5 degrees W. These positions were primarily based on information in item 2), although information in other items was also taken into account. For the period Sept. 13-16, these position ranged from about 90 to about 30 miles towards the S. of the respective positions in Neumann et al. (1993). However, the 7 A.M. Sept. 17 position was about 90 miles to the N.N.E. of the corresponding one in the above

publication. Positions for 7 A.M. Sept. 18 and 7 A.M. Sept. 19 in Neumann et al. (1993) were kept unmodified. The author's track for Storm 7, 1901 is shown in Fig. 1.

In spite of that "moderate cyclone" (item 16) carried an implication of hurricane intensity in the terminology used in relation to Cuban storms, the author of this study kept the tropical storm status given to this storm in Neumann et al. (1993) as for Storm 6, 1901; that decision was made on the basis of information in item 1) but, above all, on the basis that no hurricane winds or adequately pressures were reported in other items. The tropical storm status was kept over the period Sept. 9-18, but it was changed into the extratropical stage on Sept. 19.

Storm 8, 1901 (Sept. 12-17), T. S.

This storm is the same one which Neumann et al. (1993) identify as Storm 7, 1901.

The following information was found about this storm: 1) Data extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Sept. 11, ship near 9 N., 30 W., S.W. f. 3, 29.88; ship near 9 N., 26 W., S. f. 2, rain. Sept. 12, ship near 13 N., 27 W., S.E. f. 7; ship near 11 N., 27 W., S.W. f. 6, rain; ship near 11 N., 30.7 W., W. f. 7, 29.88; center placed 12.5 N., 27.5 degrees W. Sept. 13, ship near 12 N., 30 W., W. f. 9, 29.80; center to the N.N.E. of that ship. Sept. 14, ship near 12 N., 29 W., W. f. 5, 29.86; ship near 18 N., 27 W., E.S.E. f. 10; Sao Vicente (Cape Verde Is.), N. f. 4, 30.10 (wrong data). Sept. 15, ship near 18 N., 27 W., E.S.E. f. 8; ship near 13.5 N., 28.7 W., W. f. 4, 29.91; center placed 15.3 N., 27.3 W. Sept. 16, ship near 19 N., 29 W., S.E. f. 8, center placed 19 N., 31 W. Sept. 17, ship near 20.8 N., 29 W., S.E. f. 6, showers; center not drawn on the map but maybe near 21 N., 31 W. Sept. 18, difficult to locate any center, rather a flow from the E. (Historical Weather Maps, Sept. 1901). Author's note: Wind forces (f) are on Beaufort scale, pressures are in inches.

The track in Neumann et al. (1993) as for Storm 7, 1901 was found to agree with many of the data in item 1) and, therefore, the author of this study decided to reproduce it in Fig. 1 as for Storm 8, 1901.

Data in item 1) were found to fully support the tropical storm status that Neumann et al. (1993) gave to this storm, and were found to suggest that the storm developed very rapidly from Sept. 11 to Sept. 12.

Storm 9, 1901 (Sept. 21- Oct. 2), T. S.

This storm corresponds to Storm 8, 1901 in Neumann et al. (1993).

The following information was found about this storm: 1) Data extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Sept. 21, ship near 14 N., 72 W., S.S.E. f. 3, 29.91; Kingston, N.E. f. 2, rain, 29.84. Sept. 22, ship near 15 N., 76 W., S.S.E. f. 5, 29.94; Kingston, N.E. f. 1, 29.86. Sept. 23, ship near 18 N., 86 W., E. to E.N.E. f. 4, 29.80. Sept. 24, no data available from the western Caribbean Sea. Sept. 25, Havana, E. f. 3, pressure could not be

read; Cienfuegos, S.E. f. 2, rain, 29.86; Key West, S.E. f. 2, 29.87; ship near 25 N., 84 W., N.N.E. f. 5, 29.83; ship near 23 N., 87 W., N.E. f. 3. Sept. 26, Havana, E. f. 4, 29.79; Key West, E.S.E. f. 4, pressure could not be read; Cienfuegos, S.E. f. 2, 29.83. Sept. 27, Havana, S.S.E. f. 5, 29.82; Key West, S. f. 4, 29.82; ship near 24 N., 83 W., S.E. f. 2, 29.83; ship near 27 N., 88 W., N.E. f. 7, 29.83. Sept. 28, extratropical low just S. of Atlanta (Historical Weather Maps, Sept. 1901). Author's note: Wind forces (f) are on Beaufort scale, pressures are in inches. 2) Belen College Observatory, Sept. 23, 8 A.M. In our note of 10 A.M. Sept. 17 we indicated that there was some indication that a perturbation had begun to feel its influence at Barbados. From the comparison of our yesterday's observations with those taken at other places in Cuba, the existence of a moderate cyclonic perturbation was inferred, its broad center being located about 300 miles to the S. yesterday afternoon. At present the main center of the tempest is located towards the S.W. Maybe this is the same perturbation which caused below normal barometer at Barbados on Sept. 17 and thunderstorms with heavy rains in the afternoon of that day; if this were the case it would have moved to the W. one quarter N.W. at about 10 mph. L. Gangoiti, S.J. (Diario de la Marina, Havana, Sept. 23, 1901, evening edition, p.2, col.3) Author's note: Data displayed on Historical Weather Maps for Sept. 17-20 (not shown) support the hypothesis that a weak weather system moved from near Barbados on Sept. 17 to the S. of Jamaica on Sept. 21, having caused a light W. wind at Curacao in the morning of Sept. 19. 3) Belen College Observatory, Sept. 25, 8 A.M. On Monday (Sept. 23) the broad center of the tempest to the S.W. remained stationary and yesterday the low clouds were running fast from S.E. one quarter E., E.S.E., and E. one quarter N.E., indicating a change in the direction of the major axis of the ellipse and a closer proximity to Havana. Low clouds at Pinar del Rio were moving rapidly from the E. yesterday morning and afternoon, and the wind (there) was blowing from the first quadrant in the afternoon. By 2 A.M. this morning, the central region (of the tempest) had moved somewhat towards the N.W., but it has not emerged into the Gulf yet. L. Gangoiti, S.J. (Diario de la Marina, Sept. 25, 1901, evening edition, p.2, col.4). Author's note: A more plausible explanation for the cloud changes at Havana and meteorological conditions at Pinar del Rio would be that the storm was never in reality to the S.W. of Havana and that the described conditions were related to the slow approximation of the storm to the Cuban coast, coming from a southerly direction, and causing an increasing influence of the storm circulation at Havana and Pinar del Rio. 4) Belen College Observatory, Sept. 27, 8 A.M. As a result of comparing observations taken at Pinar del Rio by our friend D. Eduardo Gomis yesterday morning and afternoon, it is evident that the main center of the cyclonic perturbation passed a short distance to the W. (of Pinar del Rio) in a N.W. direction and with a considerable increase in forward speed. The angular velocity of the low-level currents was very remarkable, being (there) much larger than at Havana, and the one observed here being larger than at Cienfuegos. L. Gangoiti, S.J. (Diario de la Marina, Havana, Sept. 27, 1901, evening edition, p.2, col.1). 5) Batabano, Sept. 27 (via telegraph). The rainy

weather continues. The aneroid barometer reads 759 millimeters (29.88 inches) and rising, and the wind blows from the S.S.E. Several streets are flooded (Diario de la Marina, evening edition, p.2, col.2). 6) Minimum pressure at Havana (Belen College Observatory) was 755.5 millimeters (29.74 inches on Sept. 26 (Sarasola, 1928). 7) Maximum wind velocity at Tampa was S. 27 mph on Sept. 27 (Monthly Weather Review, Sept. 1901). 8) Map showing a partial track for the storm as follows: Morning of Sept. 27, near 27.5 N., 84.5 W.; evening of Sept. 27, between Jacksonville and Tallahassee; morning of Sept. 28, S. of Atlanta; evening of Sept. 28, near Nashville; morning of Sept. 29. over eastern Lake Erie; evening of Sept. 29, near 46 N., 75 W.; morning of Sept. 30, near 47.5 N., 67.5 W.; evening of Sept. 30, near 47 N., 60 W. (Monthly Weather Review, Sept. 1901). 8) A storm was first observed near 12 N., 81 W. on Sept. 20, 1901 and lasted 14 days; it recurved near 23 N., 86 W. and it was last observed near 66 N, 1 W. (Mitchell, 1924). Author's note: A portion of the track in Mitchell (1924) was found to be similar to the ones in Tannehill (1938) and Neumann et al. (1993). However, the track in the latter publication was started on Sept. 21 instead of on Sept. 20.

On the basis of information in items 1) through 4) and in item 8), the author of this study introduced some modifications along the track which is displayed in Neumann et al. (1993) as for Storm 8, 1901. A possible track of the system backwards to the Lesser Antilles prior to Sept. 21 (item 2 and corresponding author's note) was not implemented due to its very weak character while moving over the eastern Caribbean Sea. New 7 A.M. positions were estimated for the period Sept. 21-28 as follows: Sept. 21, near 14.0 degrees N., 75.0 degrees W.; Sept. 22, near 15.0 degrees N., 79.0 degrees W.; Sept. 23, near degrees 16.5 N., 82.0 degrees W., Sept. 24, near 18.5 degrees N., 83.0 degrees W.; Sept. 25, near 20.0 degrees N., 83.5 degrees W.; Sept. 26, near 21.5 degrees N., 84.0 degrees W.; Sept. 27, near 25.5 degrees N., 85.0 degrees W.; Sept. 28, near 32.5 degrees N., 84 degrees W. The distance between the above positions and the corresponding ones in Neumann et al. (1993) ranged from about 350 miles on Sept. 21 to about 70 miles on Sept. 23-24. 7 A.M. positions for the period Sept. 29-30 in Neumann et al. (1993 were kept unchanged because they were not found to differ significantly from information for those days in item 8); their 7 A.M. positions for Oct. 1-2 were also kept unchanged. The author's track for Storm 9, 1901 is shown in Fig. 1.

Rigorously speaking, the tropical storm status which Neumann et al. (1993) gave to this storm as for Storm 8, 1993 could not be verified in the light of information in the above items (no wind of force 8 or higher on the Beaufort scale was found). Nevertheless, the author of this study decided to keep tropical storm intensity along the track from Sept. 21 through Sept. 27 and to change the system into the extratropical stage on Sept. 28 in accordance with information in item 1).

Storm 10, 1901 (Oct. 5-14), T. S.

This is the same storm which Neumann et al. (1993) identify as Storm 9, 1901.

The following information was found in relation to this storm:

1) Data extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Oct. 5, ship near 16 N., 56 W., E. f. 3, 29.80; Barbados. N. f. 2, 29.87; ship near 10 N., 54 W., N.W. f. 4, 29.88. Oct. 6, ship near 16 N., 55 W., E.N.E. f. 4, 29.66 (pressure too low); Barbados, N.N.E. f. 2, 29.88; ship near 13.7 N., 53.7 W., N. f. 2, 29.80; ship near 8 N., 53 W., W. f. 3, 30.00 (too high). Oct. 7, ship near 16 N., 56 W., E. f. 2, rain, 29.83; ship near 13 N., 58 W., W. f. 1; ship near 13 N., 54 W., S.W. f. 1., 29.80; ship near 15 N., 48 W., S.S.E. f. 11, 29.86. Oct. 8, ship near 23 N., 60 W., E. f. 3, rain; ship near 20 N., 64 W., N.E. f. 3, 29.77; ship near 16.5 N., 63 W., N. f. 3, 29.74; St. Kitts, N. f. 2, 29.76; Dominica, N. f. 2, 29.78; Martinique, W.S.W. f. 4, 29.80; Barbados, W.N.W. f. 2, 29.80; ship just E. of Barbados, W. f. 4, 30.00 (too high); ship near 12 N., 58 W., S.W. f. 4; ship near 12 N., 53 W., S. f. 2, rain, 29.74 (probably too low); ship near 14 N., 52 W., S. f. 3, 29.83. Oct. 9, ship near 16 N., 60 W., W. f. 6, 29.88; Dominica, E. f. 1, 29.78; Martinique, S.W. f. 4, 29.79; Barbados, S. f. 3, 29.80; St. Kitts, N.E. f. 1, 29.74; San Juan, S. f.1, 29.75; ship near 21 N., 64 W., N. f.2, 29.80; ship near 24 N., 58 W., S.E. f. 6, 29.88; Santo Domingo, N. f.2, 29.76; Port-au-Prince, W.N.W. f. 3, 29.73; ship near E. tip of Cuba, N.W. f.3, 29.80; ship near 23 N., 74 W., N.N.E. f. 5, 30.00; ship near 26 N., 70 W., N.N.E. f. 9, 30.00; Turk Is., S.E. f. 1, 29.78; ship near 23 N., 68 W., S.E. f. 2, 29.71. Oct. 10, Turk Is., W.N.W. f. 2, 29.84; ship near 26 N., 73 W., N.E. to E.N.E. f.5, pressure could not be read; ship near 21 N., 74 W., W. to W.N.W. f. 4, pressure could not be read; ship near 33 N., 69 W., E.S.E. f. 5, 30.00; ship near 22 N., 62 W., S.E. f. 4, 29.88; San Juan, S.W. f. 1, 29.85; Bermuda, E. f. 2, showers, 29.88; ship near 33 N., 66 W., S. f. 3, 29.80 (pressure too low). Oct. 11, weak frontal wave near 36 N., 66 W.; Bermuda and a ship N. of that island showed W.S.W. winds f. 2. Oct. 12, extratropical low placed 39 N., 60 W. Oct. 13, extratropical low placed 41 N., 53 W. Oct. 14, extratropical low placed 45 N., 41 W. (Historical Weather Maps, Oct. 1901). Author's note: Wind forces (f) are on Beaufort scale, pressures are in inches. 2) A storm was first observed near 15 N., 53 W. on Oct. 7, 1901 and lasted 7 days; it recurved near 22 N., 70 W. and it was last observed near 46 N., 40 W. (Mitchell, 1924). Author's note: The corresponding track in this publication was found to be similar to the ones in Tannehill (1938) and in Neumann et al.(1993) as for Storm 9, 1901).

Information in item 1) allowed the author of this study to introduce some modifications along the track displayed in Neumann et al. (1993) and to start such a track two days earlier, i. e. on Oct. 5. The author's estimated positions for the period Oct. 5-11 were as follows: Oct. 5, near 12.0 degrees N., 54.0 degrees W.; Oct. 6, near 13.5 degrees N., 53.3 degrees W.; Oct. 7, near 15.0 degrees N., 55.0 degrees W.; Oct. 8, near 17.5 degrees N., 58.5 degrees W.; Oct. 9, near 21.0 N., 62.3 W.; Oct. 10, near 24.5 N., 68.5 W.; Oct. 11, near 35.0 degrees N., 65.0 degrees W. As a difference with the one in Neumann et al. (1993), this track did not bring the storm center over the Leeward Islands and Puerto Rico but it kept it at a good distance to the N.E. of both places. Data in item 1) suggested that a second center, which formed near the

southern end of a front, existed near the northern coast of Hispaniola on Oct. 9 and that both centers merged on Oct. 10 and then moved northward as a wave along the frontal boundary on Oct. 11. Positions given in Neumann et. al. (1993) for the extratropical system over the period Oct. 12-14 were kept unchanged. The author's track for Storm 10, 1901 is shown in Fig. 1.

The tropical storm status given to this storm in Neumann et al. (1993) as for Storm 9, 1901 was kept unchanged on the basis of a ship reporting a wind of force 11 on the Beaufort scale well to the E. of the storm center on Oct. 7 and that the W. wind of force 6 reported by a ship well to the S. of the center on Oct. 9 implies that significantly stronger winds should have occurred over the area to the E. and N.E. on the center, where data were not available on that day. The tropical storm status was denoted along the author's track over the period Sept. 5-10 but it was changed to the extratropical stage as the system reached the 30 degrees N. parallel during the night of Oct. 10-11.

Storm 11, 1901 (Oct. 15-18), T. S.

This case has been recently revealed by the author of this study. The case appeared in previous works by Tannehill (1939) and Nitchell (1924) but it is not included in Neumann et al. (1993). In that sense, it might be considered as a new one.

Documentation of this case was based on the following information: 1) Data extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Oct. 15, Jupiter, N.E. f. 5, 29.93; ship near 24 N., 80 W., N. f. 4, 29.91; Camaguey, S.S.W. f. 2, 29.84; Santiago de Cuba, S.S.E. f. 4, rain, 29.87; ship near 25 N., 86 W., E. f. 5, 29.80 (probably too low); although a front was drawn on the map its validity is questionable because temperatures were in the upper 70's and lower 80's behind the front. Oct. 16, ship near 23 N., 74 W., S. f. 10, 29.88 (probably too high); Camaguey, W. f. 2, 29.90 inches; Santiago de Cuba, S.E. f. 1, 29.89; center of a low placed 24.5 N., 75.5 W. Oct. 17, ship near 27 N., 72.7 W., N. f. 5, rain, 29.88; ship near 25.7 N., 69 W., S.W. f. 8; Turk Is., S.W. f. 4, 29.96; ship near 26 N., 68 W., no wind given, 29.86; ship near 23.7 N., 65 W., S.S.E. f. 5, 30.03; center of a low placed 26 N., 70 W.; frontal wave near 39 N., 63 W., but its associated cold front did not extend into the core of the above mentioned low. Oct. 18, ship near 25 N, 64.7 W., S. f. 4, 29.7; Bermuda, N. f. 1, rain, 29.82; ship near 26.7 N., 65.7 W., W. f. 2, 30.03 (too high); ship near 30 N., 68 W., N.E. f. 5; front just to the E. of Bermuda with temperature there at 72 degrees Fahrenheit; low probably near 28 N., 65 W., embedded in the front and rapidly weakening (Historical Weather Maps, Oct. 1901). Author's note: Wind forces (f) are on Beaufort scale, pressures are in inches. 2) A storm was first observed near 24 N., 75 W. on Oct. 16 and lasted 4 days; it was last observed near 62 N., 58 W. (Mitchell, 1924). Author's note: The track shown in Mitchell et al. (1924) was found to be similar to the one in Tannehill (1938).

On the basis of information in item 1), the author of this study prepared a track for Storm 11, 1901. 7 A.M. positions along his track were estimated as follows: Oct. 15, near 22.0 degrees N.,

78.5 degrees W; Oct. 16, near 23.7 degrees N., 75.0 degrees W.; Oct. 17, near 26.5 degrees N., 69.5 degrees W.; Oct. 18, near 28.0 degrees N., 65.0 degrees W. The author's track is shown in Fig. 1.

The author of this study gave a tropical storm status to this weather system on the basis of a ship reporting a wind from the S. force 10 on Oct. 16 and a second ship reporting a wind from the S.W. force 8 on Oct. 17 (item 1). Although storm intensity probably was not reached until late Oct. 15, tropical storm status was denoted along the author's track over the period Oct. 15-17 and was changed to extratropical stage on Oct. 18. In spite of that the tracks discussed in item 2) and its corresponding author's note were found to extend to very high latitudes, the author of this study decided to terminate his track near 29 N. because, according to information for Oct 18 in item 1), he did not find a justification to extended it any farther to the north.

Storm 12, 1901 (Oct. 30- Nov. 6), T. S.

This storm corresponds to Storm 10, 1901 in Neumann et al. (1993).

The following information was found in relation to this storm:
1) The month (Nov.) opened with a storm of tropical origin N. of Puerto Rico. At 11:10 A.M. Nov 1, the following message was telegraphed to the Weather Bureau offices at Bermuda, New York, Philadelphia and Boston: "Severe disturbance moving N.E., east of Turk Is. will pass near Bermuda Saturday (Nov. 2)." From Nov. 2 to Nov. 5 the storm center moved N.E. over mid ocean attended by gales of great violence and there is no evidence that the storm reached the European coast. The Bermuda Colonialist, Nov. 6, 1901 verifies the accuracy of the advices furnished: "The hurricane that was predicted by the Weather Bureau for Saturday arrived on time and raged for 24 hours. All the incoming steamers were delayed. The growing crops throughout the colony suffered somewhat and the storm damage to property has been considerable" (Monthly Weather Review, Nov. 1901). 2) The tropical storm was still apparently central near Bermuda yesterday morning with a considerable increase in intensity and northerly gales will extend over the North Atlantic (The New York Times, Nov. 4, 1901, p.9, col.6). 3) Information extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Oct. 30, San Juan, S.S.E. to S. f. 2, 29.81; Santo Domingo, N. f. 2, 29.84; ship near 21 N., 67 W., N.E. f. 4, 29.86 (probably too high); St. Kitts, S.E. f. 3, 29.84. Oct. 31, Santo Domingo, N.W. f. 1, 29.72; San Juan, S. f. 2, pressure could not be read; Turk Is., N. f. 1, 29.75; St. Kitts, S. f. 4, 29.76; ship near 29 N., 60 W., S.S.W. f. 6, 29.80; ship near 24 N., 61 W., S.S.W. f. 2, 29.77; ship near 26 N., 67 W., N.E. f. 6, rain, 29.68; ship near 25 N., 68 W., N. f. 4 (or 6), 29.68 (Historical Weather Maps, Oct. 1901). Author's note: Wind forces (f) are on Beaufort scale, pressures are in inches. 4) Information extracted from 8 A.M. (E.S.T.) Historical Weather Maps: Nov. 1, Bermuda, E.N.E. f. 2, 29.86; Turk Is., N.W. f. 4, 29.71; ship near 23 N., 67.7 W., W.N.W. f. 4; ship near 23 N., 65 W., S.S.W. f. 4, 29.56, ship near 26 N., 62.7 W., S. f. 2, 29.62; ship near 27.7 N., 69 W., N.E. f. 8 (or 10); , 29.62; ship near 28 N., 63 W., E.N.E. f. 7, rain. Nov. 2, a double structure was shown on

the map with centers below 1000 millibars (29.53) near 29.5 N., 60.5 W. and near 24.5 N., 65.5 W.; Bermuda, E.N.E. f. 2, rain, 29.67; ship near 24 N., 69 W., N.N.W. f. 6, 29.56; ship near 22 N., 65 W., S.W. f. 7, 29.56; ship near 28 N., 66 W., N.N.E. f. 6, rain; ship near 28 N., 67 W., N.N.E. f. 8, 29.80; ship near 27 N., 61.7 W., S.S.W. f. 5, 29.65; ship near 33 N., 63 W., N.E. f. 7; ship near 35 N., 61 W., E. f. 7, 29.86; ship near 23 N., 61 W., S.W. f. 6, 29.68; ship near 30 N., 57 W., S. f. 2, 29.62. Nov. 3, numerous ship reports around the center of a low placed 30.5 N., 60.5 W. with central pressure below 990 millibars (29.24 inches); lowest barometer reported by a ship was 29.21 with wind S. f. 8 (or 10) near 29 N., 60 W. Nov. 4, data difficult to read; center of intense low placed 37.3 N., 56.3 W. with central pressure of 975 millibars (28.79); however, no ship showing hurricane winds (f. 12) was found plotted on the map; although cold air had not reached the storm center, it was definitively entering the storm circulation causing a temperature of 64 degrees Fahrenheit at Bermuda. Nov. 5, center of a low with pressure below 985 millibars (29.09) placed 38 N., 55.5 W. (maybe a bit too far to the W.S.W.); inner portion of the storm gradually transforming into extratropical. Nov. 6, ship near 39 N., 52 W., N.E. f. 7, 29.50; ship near 34 N., 50 W., W.S.W. f. 9, 29.44; low embedded in front and probably located near 37 N., 50.5 W. (Historical Weather Maps, Nov. 1901). Author's note: As indicated before, wind forces (f) are on Beaufort scale and pressures are in inches. 5) A storm was first observed near 22 N., 68 W. on Oct. 31, 1901 and lasted 14 days; it was last observed near 60 N., 20 E. (Mitchell, 1924). Author's note: Portions of the corresponding track in Mitchell (1924) were found to be similar to the tracks shown in Tannehill (1938) and Neumann et al. (1993).

Primarily on the basis of information in items 3) and 4), the author of this study introduced numerous modifications along the track which is shown in Neumann et al. (1993) as for Storm 10, 1901 and extended such a track backwards in time to Oct. 30. The author's newly estimated 7 A.M positions for the period Oct. 30-Nov. 6 were as follows: Oct. 30, near 19.3 degrees N., 67.3 degrees W; Oct. 31, near 24.0 degrees N., 66.7 degrees W.; Nov. 1, near 26.7 degrees N., 65.3 degrees W; Nov. 2, near 29.5 degrees N., 63.5 W.; Nov. 3, near 31.0 degrees N., 60.3 W.; Nov. 4, near 37.0 degrees N., 56.0 degrees W.; Nov. 5, near 38.5 degrees N., 54.5 degrees W.; Nov. 6, near 37.0 degrees N., 50.5 degrees W. For the period Oct. 31- Nov. 6, differences between corresponding positions in Neumann et al. (1993) and the author's ones were found to range from about 220 miles on Nov. 4 to about 60 miles on Nov. 1 and Nov. 3. The author's track for Storm 12, 1901 is shown in Fig. 1.

The tropical storm status which was given to this storm by Neumann et al. (1993) as for Storm 10, 1901 was verified on the basis of abundant information in items 3) and 4) and found to be correct. This status was denoted along the author's track over the period Oct. 30- Nov. 5 in spite of that reported winds were below force 8 on the Beaufort scale on Oct. 30-31 (item 3); the extratropical stage was introduced on Nov. 6 when extratropical characteristics were fully acquired by the weather system (item 4). The pressure as low as 28.79 inches which was indicated on the weather map for Nov. 4 (item 4) would have normally supported full

hurricane winds in a tropical system; however, no ship reported winds of hurricane intensity on that day and all throughout the existence of the storm. Therefore, an upgrade of the storm to a hurricane was discarded.

Special statement.

In addition to the storms which were fully discussed above, one possible case was found for 1901.

A) Case of Oct. 5, 1901.

The following information was found about this possible case:
1) Oct. 4, a force 4-6, N.E. flow was found over the Cape Verde Islands. Oct. 5, ship near 18 N., 29 W., E.N.E. f. 5, 29.83; ship near 15 N., 26 W., E.S.E. f. 6; ship near 14 N., 27 W., S.S.E. f. 8, rain, 29.83. Oct. 6, a force 3-5, E. flow was found in the eastern Atlantic between 10 and 20 degrees N. and between 25 and 40 degrees W. (Historical Weather Maps, Oct. 1901). The above information suggested the existence of a well-developed tropical weather system of weak tropical storm intensity (f. 8) near 14.0 degrees N., 28.5 degrees W. in the morning of Oct. 5. However no evidence of the system was found on the previous and next days. This brought some question about how reliable the Oct. 5 data were. Therefore, this case is kept as a possible one.

A few other tropical weather systems were identified on weather maps but they were so weak that it is believed that they did not have any chance to have reached storm intensity.